

APPARATUS AND METHOD FOR THE MEASUREMENT OF DIFFRACTING STRUCTURES

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10 ABSTRACT

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15 A normal incidence reflectometer includes a rotatable analyzer/polarizer, which permits measurement of a diffracting structure. Relative rotation of the analyzer/polarizer with respect to the diffracting structure permits analysis of the diffracted radiation at multiple polarity orientations. A spectograph detects the intensity of the spectral components at different polarity orientations. Because the normal incidence reflectometer, in accordance with the present invention, uses normally incident radiation and an analyzer/polarizer that rotates relative to the diffracting structure, or vice-versa, the orientation of the diffracting structure does not affect the accuracy of the measurement. Thus, the sample holding stage may use X, Y, and Z, as well as r- θ type movement and there is no requirement that the polarization orientation of the incident

20 light be aligned with the grating of the diffraction structure. A non-linear multivariate regression process is used to adjust the parameters of an optical model, such as rigorous coupled-wave analysis, to provide a match with the measured data.